

Ultra-High-Resolution Photography of Paintings

Working with partners in science, engineering, and industry, the division of imaging and visual services at the National Gallery of Art has been modernizing its tools to increase resolution in its photography of paintings. Here are some state-of-the-art improvements that have been implemented.

INCREASED DETAIL

Advanced digital camera technology now provides the capacity for unprecedented resolution. Using the camera's full resolution to capture just one section at a time, we are able to increase dramatically the amount of detail captured.

CUSTOM MOTORIZED EASEL

Our computer-controlled motorized easel allows us to photograph a painting in precise regions (tiles) with repeatable accuracy within 0.05 inches. The tiles are then "stitched" together as a whole into what becomes an ultra-high-resolution digital image that provides extraordinary detail, revealing small brushstrokes and hairline cracks that may be invisible to the naked eye.

"As a paintings conservator, the ability to zoom in on images online while maintaining resolution is an invaluable resource in understanding how a painter utilized layers to accomplish specific effects."

—Michael Swicklik, senior conservator, department of painting conservation



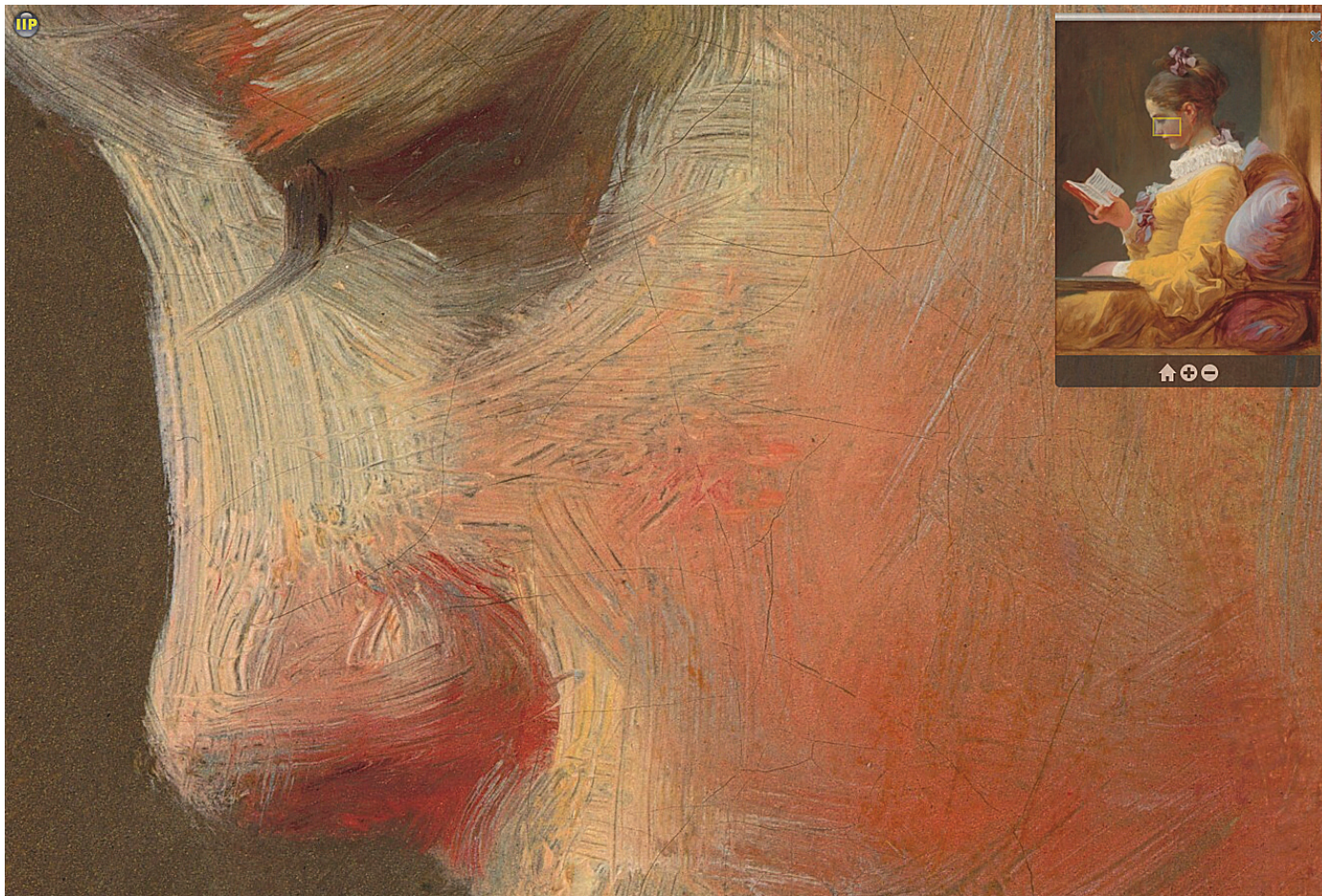
UNCONVENTIONAL WISDOM

With advice from our technical partners, we designed and fabricated our easel to move the painting while keeping the camera and lights stationary, the opposite of many other step-and-repeat systems. By not forcing a fixed relationship between the camera and lights, we allow maximum flexibility to use any camera and to vary the direction and quality of the light, the distance of light to the artwork, or the type of light used in order to produce the desired reproduction. Options include standard visible light photography, raking light photography, polarized light photography, and ultraviolet-induced visible fluorescence photography, all possible without compromising any detail.

Photographing a single tile of the image mosaic.
Giovanni Battista Tiepolo, *Bacchus and Ariadne*,
c. 1743/1745, oil on canvas, National Gallery of Art,
Timken Collection

"These high-resolution images are in some cases more revealing as to paint surface and condition than direct, 'naked eye' analysis. And the fact that such intensely high-quality visual information can be shared with colleagues off site is enormously liberating in terms of research."

—Mary G. Morton, curator and head of the department of French paintings



Jean-Honoré Fragonard, *Young Girl Reading*, c. 1770, oil on canvas, National Gallery of Art, Gift of Mrs. Mellon Bruce in memory of her father, Andrew W. Mellon. See pan/zoom on our website at go.usa.gov/KAZk

“These images of paintings are without doubt the finest and most useful I have seen over the course of my career as an art historian. The amount of visual information conveyed about the paintings is truly exceptional, and I know that anyone interested in the world of art will greatly benefit from using them, whether for scholarly research, publication, or general enjoyment.”

—Franklin Kelly, deputy
director and chief curator

SAFETY FIRST

Naturally, protecting the integrity and safety of the painting is of extreme importance. The motorized easel has a flexible mounting system that securely accommodates various sizes, weights, and thicknesses, and it moves at a very slow rate to maintain stability and to minimize vibration. The easel is equipped with automatic sensors as well as multiple manual kill switches, any of which will halt the easel at an instant if an object or other danger is detected.

EVERYONE BENEFITS

Many audiences benefit from the ultra-high resolution of our digital images. Conservators and conservation scientists find them sufficiently detailed to document the state of a painting before and during conservation treatments. Publishers can print reproductions of both the whole painting and small details from the same digital file and without the need for new photography of the detail. Artists and art historians can explore a painting to examine the artist’s brushstrokes and working methods. Anyone at all is able to enlarge any section of a painting to see small details that are not apparent in conventional reproductions or even when viewing the work of art in person.

ngaimages@nga.gov